

The R-process, nucleosynthesis, and new nuclear masses

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Precise, accurate measurements of nuclear masses are crucial for astrophysical modeling, reproducing the observed solar abundances of the elements, and for disentangling the nuclear physics imprinted on those abundances. More generally, masses are necessary for understanding nucleosynthesis via the r-process, thought to be responsible for over 50% of the elements heavier than Iron. The advent of ion traps and storage rings has generated a profusion of very precise measurements since the 2003 Atomic Mass Evaluation. I compiled an up-to-date list of new measurements from labs worldwide and incorporated them into Bradley Meyer's (Clemson University) classical model of the r-process to examine the impact of the new measurements. Sensitivity studies of various theoretical mass models and the new measurements in the r-process code, showed the largest deviations in the $A = 70 - 85$ mass region. These studies will be used to plan new measurements of nuclei along the r-process path, near ^{78}Ni .